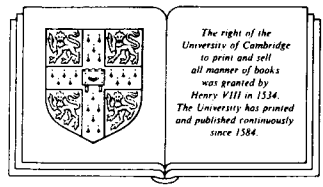
MURRAY LAVER

Information technology: agent of change



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Contents

1	With our eyes open	page 1
2	The ingredients of IT	6
3	This business of information	28
4	Economics and IT	45
5	Productivity, IT and employment	64
6	IT and the individual	86
7	Safety and security	104
8	Matters of politics	140
9	Safe, and pleasant to use	156
	Appendix IT: summary agenda of aims for all concerned	177
	References	182
	Index	185

1

With our eyes open

Transistors were invented at just the right time for information technology. Offering high reliability and low power consumption, they were immediately attractive to telecommunication engineers and computer designers, and their use surged ahead when it became possible to manufacture thousands of transistor circuits on one small wafer of silicon. Intense competition between suppliers forced them into continuous improvement and, because costs fell sharply with mass production, competition led also to the creation of surplus manufacturing capacity. Producers scrambled to find new markets to absorb their rising output, and few corners of life in Western countries have been left untouched by the silicon chip.

Technological developments of every kind have been so rapid in this century that we have had to accept more changes within our lifetimes than once were spread over many generations. Information technology has helped to force the pace of change in industry, commerce, government and everyday living; but nowhere is development faster than in information technology (IT) itself. Genetic engineering, nuclear energy, and IT have been lumped together as extreme examples of our obsession with 'high technology'. Critics have been moved to speculate whether changes are now coming upon us too rapidly to be accommodated without unacceptable amounts of human and social stress.

Many forecasts of life under IT strive to make our flesh creep at the prospect of a bleak future among the robots in a police state. Journalists know what most of us like to hear: life does become

more interesting when there really could be wolves in the woods; and lurid apocalypses are more exciting than the aseptic utopias foreseen by some information scientists. But, 1984 has been postponed: utopia is, literally, nowhere. Certainly the media perform a valuable service by drawing our attention to the unpleasant consequences, for those are apt to escape mention by the promoters of any new project. Yet, we must not sink into a timid neurosis, believing with Ralph Waldo Emerson that 'Things are in the saddle and ride mankind'[23].

Many examples could be cited to show that the consequences of adopting a new technology can ramify to affect men, women and society in ways that were neither intended nor foreseen by the innovators, and which quickly passed beyond their control. IT is proving to be singularly pervasive; its applications press on us all as workers, as citizens and as private persons. But, none of its effects is inevitable; there is no irresistible force, no technological imperative (whatever that may mean). There are, of course, powerful commercial drives, and we must attempt to direct these towards goals that will serve, not use, us.

It would be wise to become well informed before we attempt to decide what is best to do. I am not suggesting that each one of us, electors and members of governments, must dive deeply into the entrails of computers, become expert programmers, or master the mysteries of telecommunications. Knowing how a carburettor worked could not have equipped anyone to predict or regulate the social and economic effects of the internal combusion engine. We must learn enough to challenge and appraise what the experts choose to tell us.

Experts love to wallow in the technicalities of their art, but those among them who aspire to the status and rewards accorded to the members of a profession cannot ignore the wider consequences of their work, unless its applications are trivial or affect only those who are fully aware of what may happen. Neither is true of IT. IT's professionals have a clear duty to inform the public about the powers and the limitations of IT, and to draw attention to whatever consequences they are able to foresee. In doing so in terms that ordinary men and women can understand, they will also deepen and enlarge their own understanding.

Not every expert will welcome that task. Most of IT's professionals are young, tough minded, ambitious, and keen to develop their careers. The judgment of their peers awards no marks for popularizations – quite the reverse. There is also a certain glamour associated with the practice of an esoteric art, one 'not understanded of the people'[11] Older professionals have learnt how easy it is to make a fool of oneself in someone else's subject, and feel that if there are any wider consequences they are best left to some other kind of expert, say to another professional in sociology or human relations. But the problems are upon us and could quite suddenly become too urgent, too late. They are also much too important to be ignored, or to be handled in ignorance or to be left solely to experts of any kind.

The chapters that follow treat their themes in general terms, but where specific examples are used they relate to life in the industralized democracies of North America, Western Europe and Japan. Those are, after all, the places where IT has taken hold but there is a risk of provincialism, of mistaking the local for the universal. Certainly the consequences can be expected to be different in the centralized socialist states, and in Third World countries. Readers should be aware of two other sources of potential bias. The serious discussion of these issues has so far been confined to a few IT professionals and some 'intellectuals', but these constitute a very small self-selected fraction of the population, and are far from typical of the whole. Again, most of the participants have come from Caucasian backgrounds, and cannot pretend to speak for other cultures, not even those of their own increasingly multi-racial societies.

Up to now, IT has been used to speed-up and cheapen existing tasks rather than to make entirely new things possible, although as we move into the possibilities of artificial intelligence that may change. So far, the impact on people and society has been minor. The worries are worries about possible futures, and prediction is an uncertain art. Simple extrapolation from the past works well enough for the near future, for that has been determined largely already by equipment installed and investments made. The planning, development and operation of major systems spans many years, and that introduces a measure of continuity.

Predicting the development of any technology is straightforward compared with attempting to forecast its social, economic and political consequences, because, for the most part, those are the unintended accompaniments of 'progress', and not the deliberately planned results of social engineering. Computers themselves have been recruited to help in working out the longer-term implications by simulations that model our predicament. Yet, in many social and economic analyses the models are little more than descriptions of equilibrium situations. In practice, the most troublesome problems arise from the transient disturbances that are always associated with moving from here to there. Equilibria are rather rare phenomena which receive undue emphasis because they are easy to analyse: real life is one transient after another.

To see beyond the immediate future we need to go behind simple descriptions and the naive extension of trends, and elucidate the causes of change. Here we encounter two severe difficulties which beset all social studies. The first flows from the wide range and variability of human behaviour; the second stems from our ignorance. We just do not know how many causes are operating simultaneously in a given situation, nor can we safely assume that their influences can be independently assessed, for each may inhibit or enhance the actions of others. We rarely know which are relevant in particular circumstances, nor exactly what relations exist between them, nor in what time-scales each operates; and we cannot experiment on real societies in order to find out. The most valuable contribution of computer modelling may well be to provide surrogate societies on which economists and sociologists can experiment to develop and refine their ideas.

The social problems raised by IT are less obtrusively physical than those of some other technologies. The IT industry is not very likely to injure its workers, to destroy amenities or to pollute the environment – although the manufacture of silicon chips has done so. Indeed, noise, pollution and the waste of energy could all be reduced by using IT to replace the conveyance of mail and of human passengers. The other side of that coin is reduced employment in the postal and transport industries. The displacement of labour is the most immediate and certainly the most

discussed impact of IT. Unemployment is an economic and social problem that probably requires a political solution, and political and economic power each grow near the sources of information. IT may be used to concentrate those powers, but it could equally well be used to promote a radical decentralization: the choice is open.

I firmly believe that as many of us as are willing to make the effort should equip ourselves with sufficient understanding of IT's immense potential, and its limitations, to be able to take part in reaching the decisions that will shape our future. As Logan Pearsall Smith once wrote: 'Only those who get into scrapes with their eyes open can find the safe way out'[61].